Spring-biased contacts **1420** may be attached to flexible circuit board **1550** by inserting terminals of spring-biased contacts **1420** into the openings in flexible circuit board **1550** and soldering. A cap **1410** having openings for contacts **1420** may be placed over contacts **1420**. Cap **1410** may further include gaskets **1520** in openings in cap **1410**. An additional gasket **1530** may be placed or formed between contacts **1420** and inside edges of openings in cap **1410**. Gaskets **1520** and **1530** may be formed of silicone or other sealing material. Cap **1410** may be formed as a two shot injection molded process, where the main part of cap **1410** is formed in a first shot and gaskets **1520** are formed in a second shot. Cap **1410** may be attached to flexible circuit board **1550** using a double-sided adhesive layer **1540**. Adhesive layer **1540** may be a heat activated film or adhesive layer. Bracket **1430** may be attached using a second adhesive layer **1560** to a bottom of flexible circuit board **1550**. Adhesive layer **1560** may also be a heat activated film or adhesive layer. Lid **1510** may be placed over cap **1410**. Lid **1510** may be a portion of a device enclosure for a device housing this contact structure. The enclosure may be conducive or nonconductive. Gasket **1530** may be placed around a raised surface of cap **1410** and be located between cap **1410** and lid **1510**. Threaded inserts **1432** may be press-fit into openings at ends of bracket **1430**. Fasteners, such as screws **1512**, may be inserted into openings at ends of lid **1510** and screwed into threaded inserts **1432** in bracket **1430**. In other embodiments of the present invention, the threaded inserts may be replaced by threaded opening in bracket **1430**.

In this example, the contact structure may include three contacts **1420**. In other embodiments of the present invention, the contact structure may include one, two, or more than three contacts **1420**. Also, while in this example each of the contacts **1420** are located in a single raised portion, in other embodiments of the present invention, more than one raised portion may be employed, and one or more contact **1420** may be located in portions of the contact structure other than the one or more raised portions. Also, while the three contacts **1420** are shown as being in a line, in other embodiments of the present invention, contacts **1420** may be arranged in other patterns.

Various spring-biased contacts **1420** may be used in contacting structures according to embodiments of the present invention. An example is shown in the following figures.

FIG. **16** illustrates a spring-biased contact according to an embodiment of the present invention. This spring-biased contact may include a contacting portion **1420** supported by housing **1610**. Terminal structure **1620** may include legs that may be inserted into openings in a flexible circuit board, printed circuit board, or other appropriate substrate.

FIG. **17** is an exploded view of a spring-biased contact of FIG. **16**. In this example, housing **1610** may include a central opening **1612**. A first end of spring **1710** may be inserted into central opening **1612**. Housing **1610** may further include notches **1616** and **1618**, as well as corner notches **1614**.

A contacting portion **1420** may have a backside cavity (not shown.) A second end of spring **1710** may be inserted into the backside cavity of contacting portion **1420**.

Terminal structure **1620** may be fit over contacting portion **1420** such that contacting portion **1420** passes through central opening **1622** of terminal structure **1620**. Terminal structure **1620** may include legs which may fit in corner notches **1614**. Tabs **1628** and **1626** may fit in notches **1618** and **1616** in housing **1610** to secure terminal structure **1620** in place relative to housing **1610**. Contacting portion **1420** may include tabs **1422**, which may fit under terminal structure **1620** near portion **1624** to hold contacting portion **1420** in place. Tabs **1628** may include raised portions **1629**, which may fit in the back side cavity of contacting portion **1420**. Tabs **1629** may help to ensure that electrical contact remains between contacting portion **1420** and terminal **1620** as the contacting portion **1420** is depressed towards housing **1610**.

In various embodiments of the present invention, different portions of this contact structure and other contact structures may be formed of various materials. For example, cap **1410** and gaskets **1520** may be formed of the same or different materials, such as plastic, LPS, or other non-conductive material. Contacting portions of spring-biased contacts **1420** may be formed of noncorrosive materials, such as gold, gold plated copper, gold plated nickel, gold-nickel alloy, and other materials. Bracket **1430** may be formed of sheet metal or other material.

In various embodiments of the present invention, different portions of this contact structure and other contact structures may be formed in various ways. For example, cap **1410** and gaskets **1520** may be formed using injection or other molding, printing, or other technique. Contact portions and other conductive portions of contacts **1420** may be machined, stamped, coined, forged, printed, or formed in different ways.

Embodiments of the present invention may provide contact structures that may be located in various types of devices, such as portable computing devices, tablet computers, desktop computers, laptops, all-in-one computers, wearable computing devices, cell phones, smart phones, media phones, storage devices, keyboards, covers, cases, portable media players, navigation systems, monitors, power supplies, adapters, remote control devices, chargers, and other devices. These devices may include contact structures that may provide pathways for signals and power compliant with various standards such as one of the Universal Serial Bus (USB) standards including USB Type-C, HDMI, DVI, Ethernet, DisplayPort, Thunderbolt, Lightning, JTAG, TAP, DART, UARTs, clock signals, power signals, and other types of standard, non-standard, and proprietary interfaces and combinations thereof that have been developed, are being developed, or will be developed in the future. In one example, the contact structures may be used to convey a data signal, a power supply, and ground. In various embodiments of the present invention, the data signal may be unidirectional or bidirectional and the power supply may be unidirectional or bidirectional.

The above description of embodiments of the invention has been presented for the purposes of illustration and description. It is not intended to be exhaustive or to limit the invention to the precise form described, and many modifications and variations are possible in light of the teaching above. The embodiments were chosen and described in order to best explain the principles of the invention and its practical applications to thereby enable others skilled in the art to best utilize the invention in various embodiments and with various modifications as are suited to the particular use contemplated. Thus, it will be appreciated that the invention is intended to cover all modifications and equivalents within the scope of the following claims.

What is claimed is:

1. A contact structure comprising:

a housing;

a first contact and a second contact, each comprising:

a flexible lever arm;

a contacting portion attached to a first end of the flexible lever arm, the contacting portion having a